



Preliminary Results of Persistent Organic Pollutants (POPs) Monitoring at Tiksi Observatory in 2010-2011

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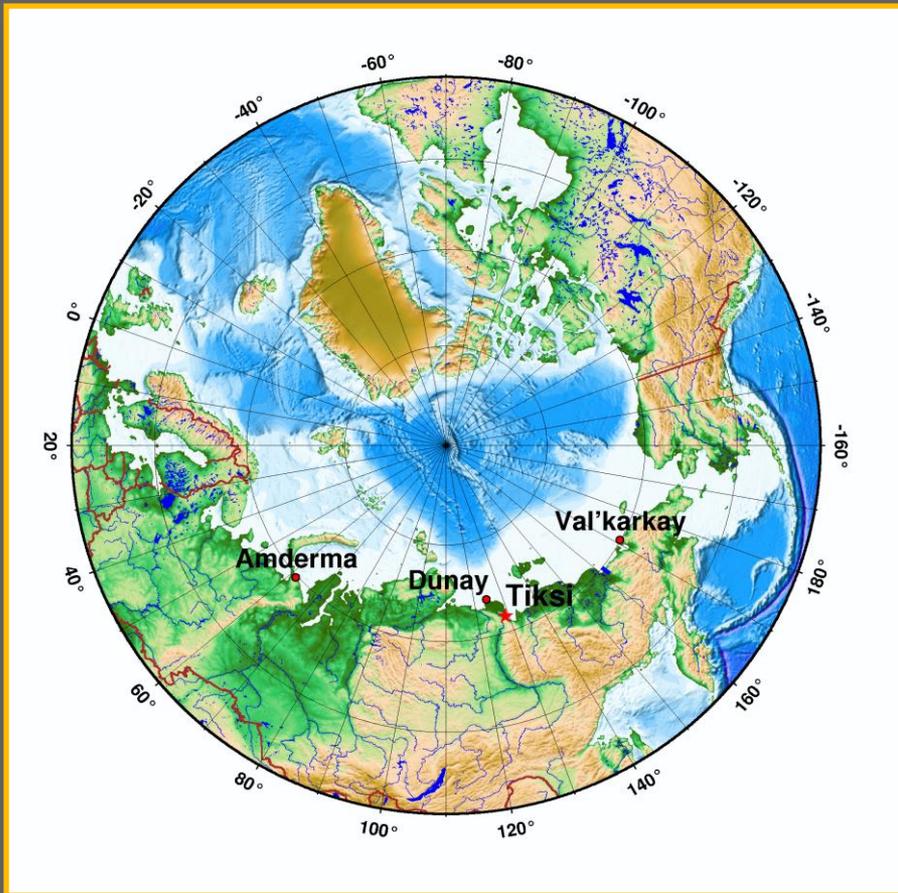


RPA "Typhoon": Persistent organic pollutants (POPs) monitoring in ambient air

- ⇒ 2009: Setup of high volume air sampler, shipment to Tiksi and installation;
- ⇒ 2010-2011: Sampling campaign;
- ⇒ 2011-2012: Analysis of samples for POPs in the Centre for Environmental Chemistry of RPA "Typhoon";
- ⇒ 2013: Processing and generalization of the data. Submitting to the AMAP thematic data center.



POPs and Hg air monitoring at Russian Arctic sites



➔ Amderma:

- POPs: 1999-2001;
- Hg: 2001-2012

➔ Dunay:

- POPs: 1993-1995

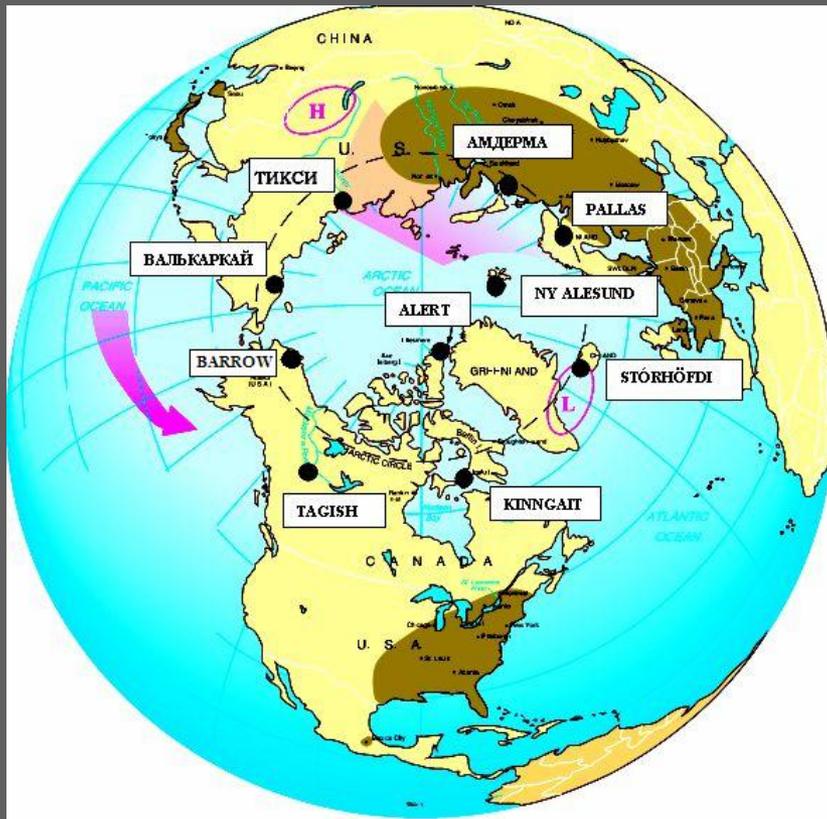
➔ Val'karkay (Chukchi):

- POPs: 2002-2003;
- 2008-2010

➔ Tiksi:

- POPs: 2010-2011

Relevant previous and ongoing programs of POPs monitoring



- ⇒ In Canada POPs monitoring has been operating at Alert since 1992;
- ⇒ In USA – Point Barrow;
- ⇒ In Finland – Pallas;
- ⇒ In Norway - Ny Alesund.

Objectives of POPs air monitoring

- ⇒ To measure the concentrations of selected PCBs, organochlorine pesticides (OCP) and polycyclic aromatic hydrocarbons (PAHs) in the atmosphere of Russian Arctic.
- ⇒ To estimate source regions for detected contaminants.
- ⇒ This provides the opportunity to make comparative analysis of POPs in the ambient air for different areas of the Arctic and the basis for modelling of their atmospheric transport.
- ⇒ The data allow to evaluate the effectiveness of international Conventions such as Stockholm Convention on POPs and Convention on transboundary air pollution.

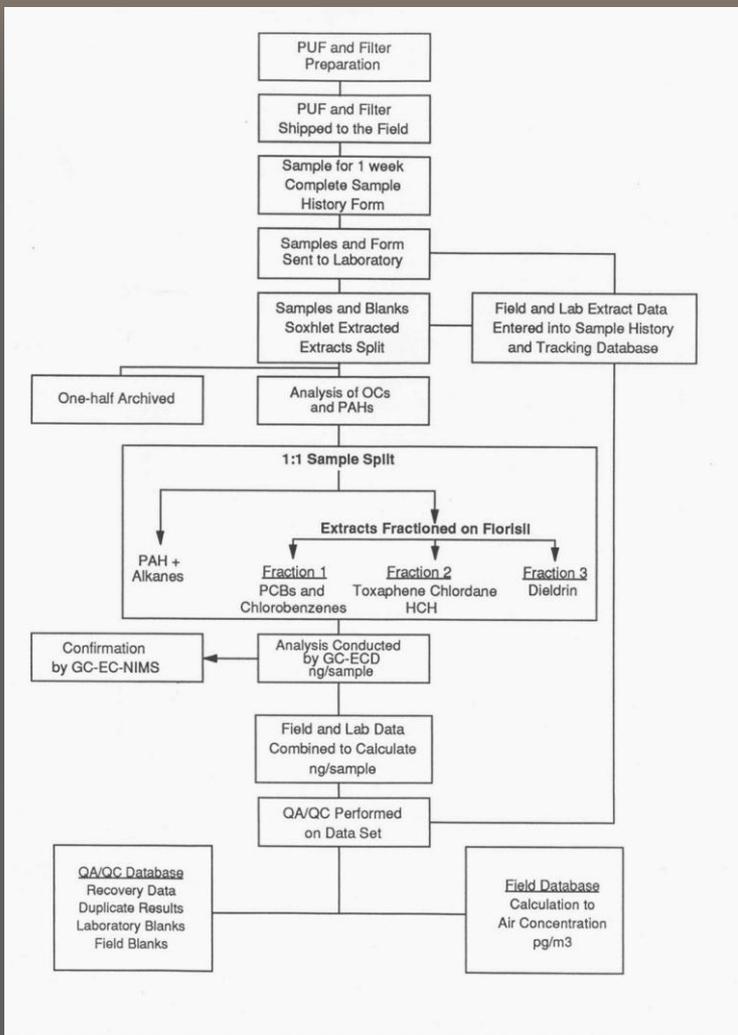
The list of determined compounds includes more than 150 individual substances:

- ⇒ Organochlorine pesticides (OCPs) and their metabolites (chlorobenzenes, DDT, mirex, toxaphenes, aldrin, dieldrin, endrin, heptachlor, chlordane etc.);
- ⇒ Polychlorinated biphenyls (PCBs) congeners;
- ⇒ Polycyclic aromatic hydrocarbons (PAHs);
- ⇒ Polybrominated diphenyl ethers (PBDEs).

The same protocols of sampling and analyses are used as for other global Arctic monitoring stations (GAW)



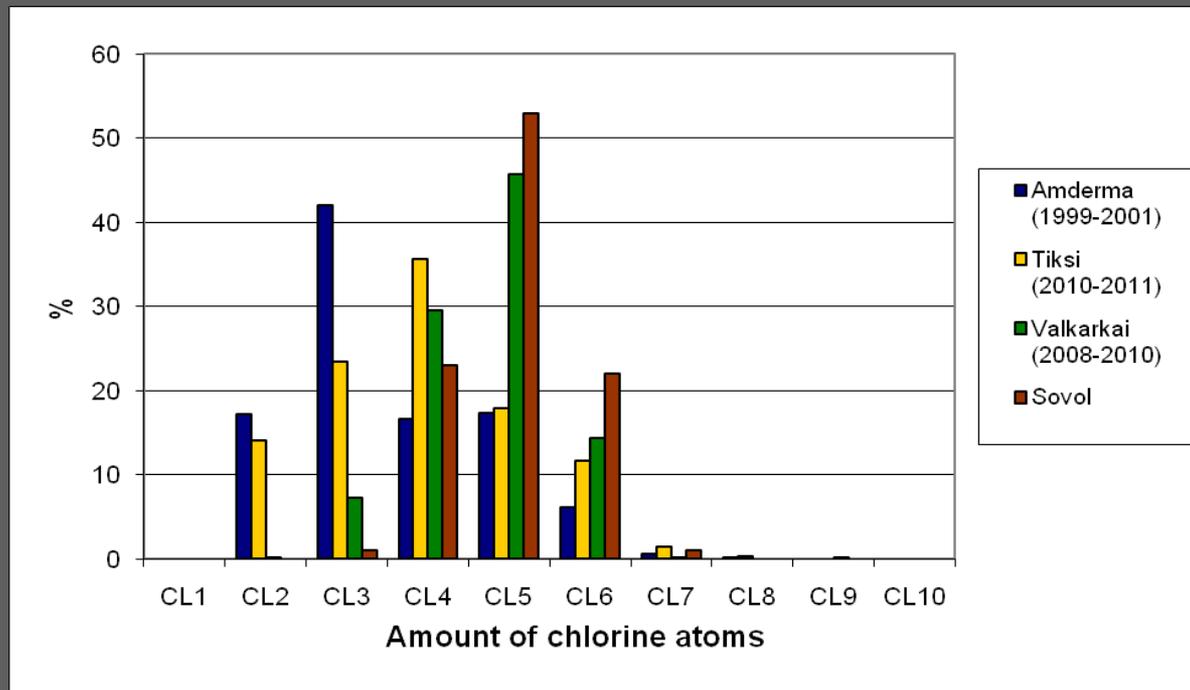
Methods and materials



Weekly samples are collected by means of a high volume sampler with a size-selective inlet for particles and a collection cartridge consisting of a glass fibre filter (particles < 10 μm) followed by two polyurethane foam (PUF) sorbent plugs (organic vapours). Samples are shipped to the CEC RPA "Typhoon" (Obninsk) and extracted with hexane (PUFs) or dichloromethane (filters). Approximately one-half of the extract is used for clean-up and analysis by gas chromatography-electron capture detection (GC-ECD) or low resolution gas chromatography-mass-spectrometry detection (GC-MS).

PCB congeners in ambient air

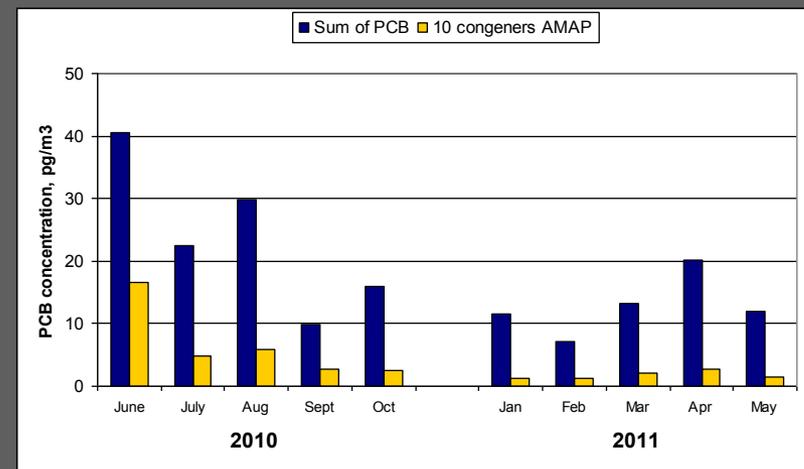
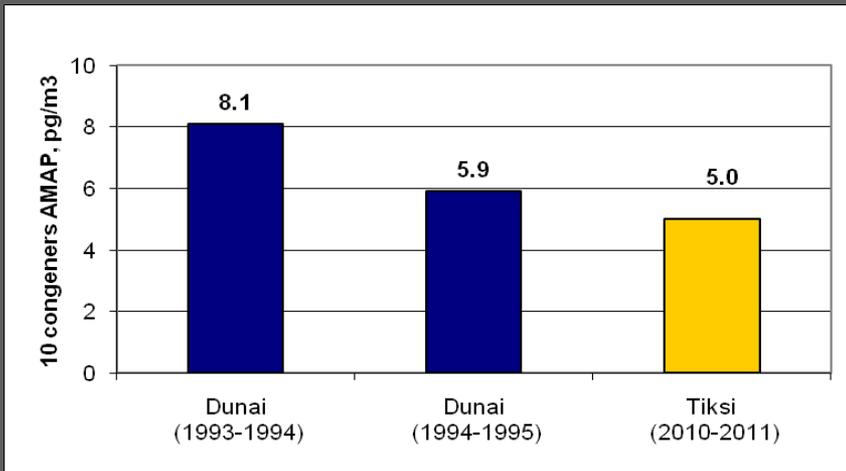
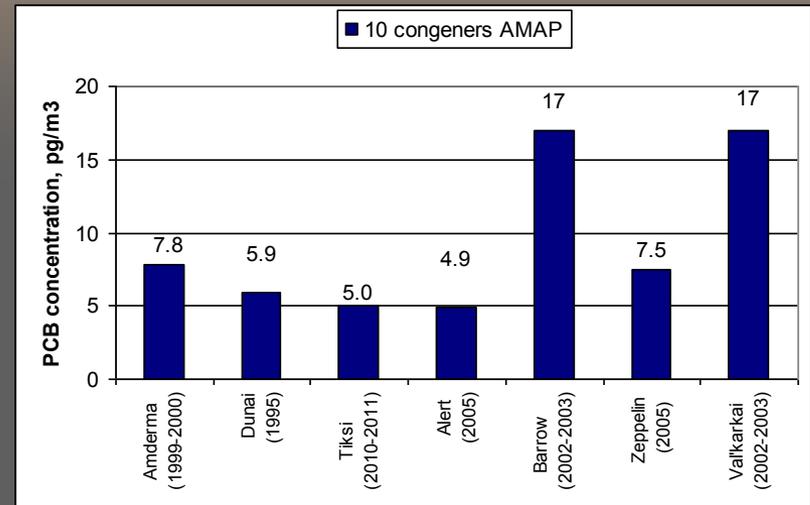
The tri substituted PCBs dominate in homologues profile for Amderma and five substituted PCB dominate in profile for Chukotka. Tiksi is intermediate – four-substituted congeners dominate.



Tiksi Meeting, St. Petersburg, 18-19
September 2012

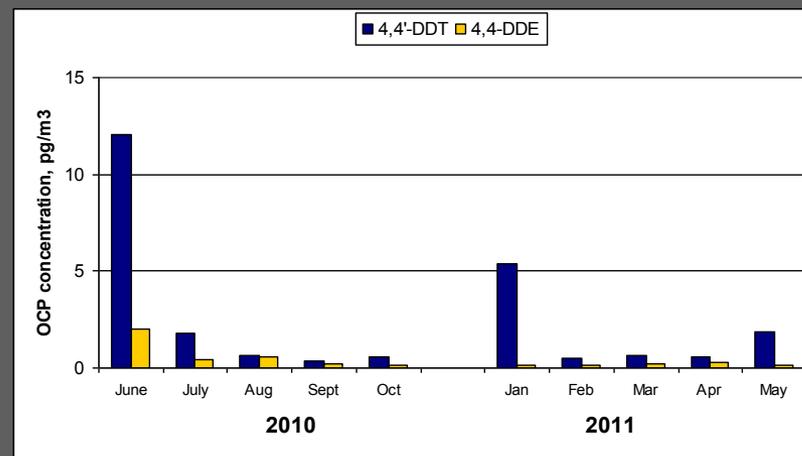
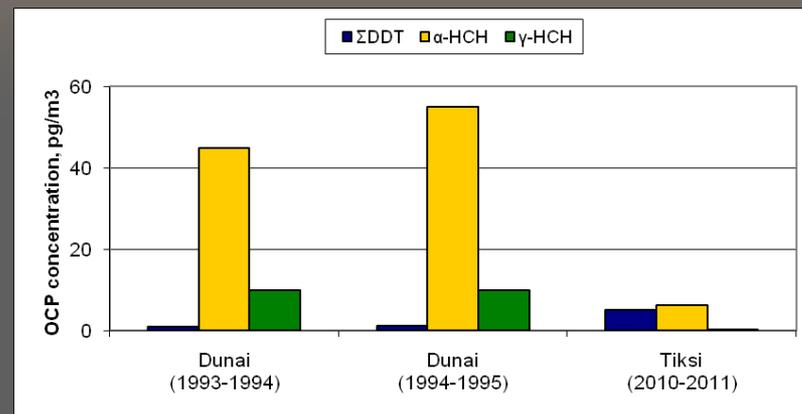
PCBs in ambient air at Tiksi

- Tiksi together with Alert are characterized by lowest PCB concentrations in ambient air.
- Higher PCB concentrations have been observed during the summer, decreased during the autumn and reached the lowest levels in winter.



OCPs in ambient air at Tiksi

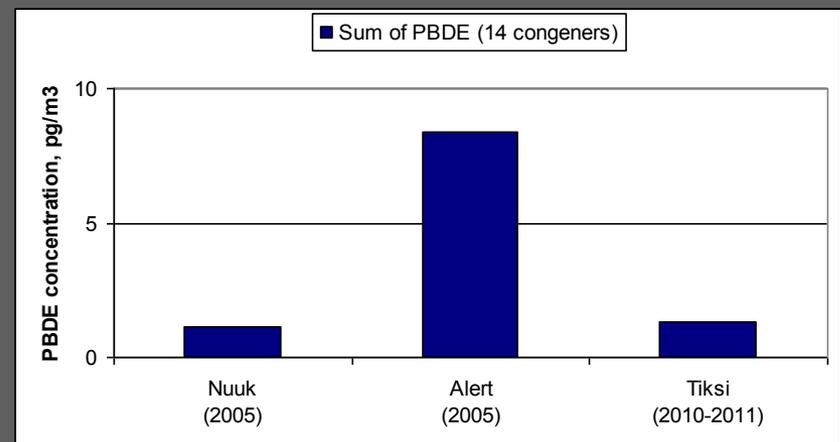
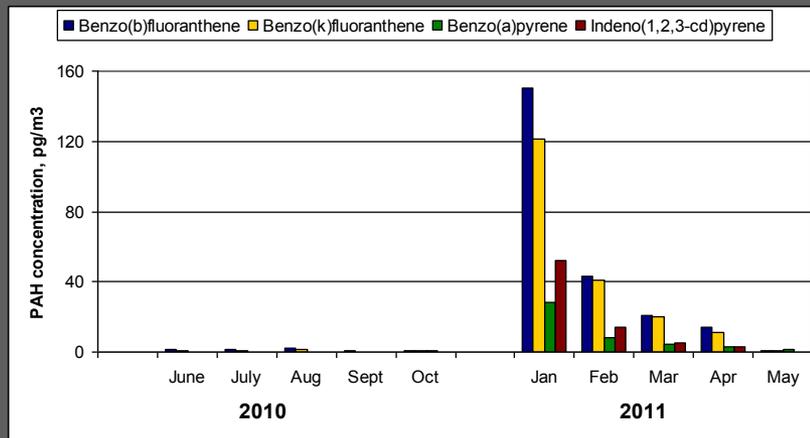
- ⇒ α -HCH dominates among OCP on all Russian sites including Tiksi. At Tiksi its levels are similar to Chukotka.
- ⇒ Tiksi is characterized by the highest levels of DDT (3.3 pg/m^3). We plan to pay attention and analyze regions – potential sources of DDT for Tiksi.



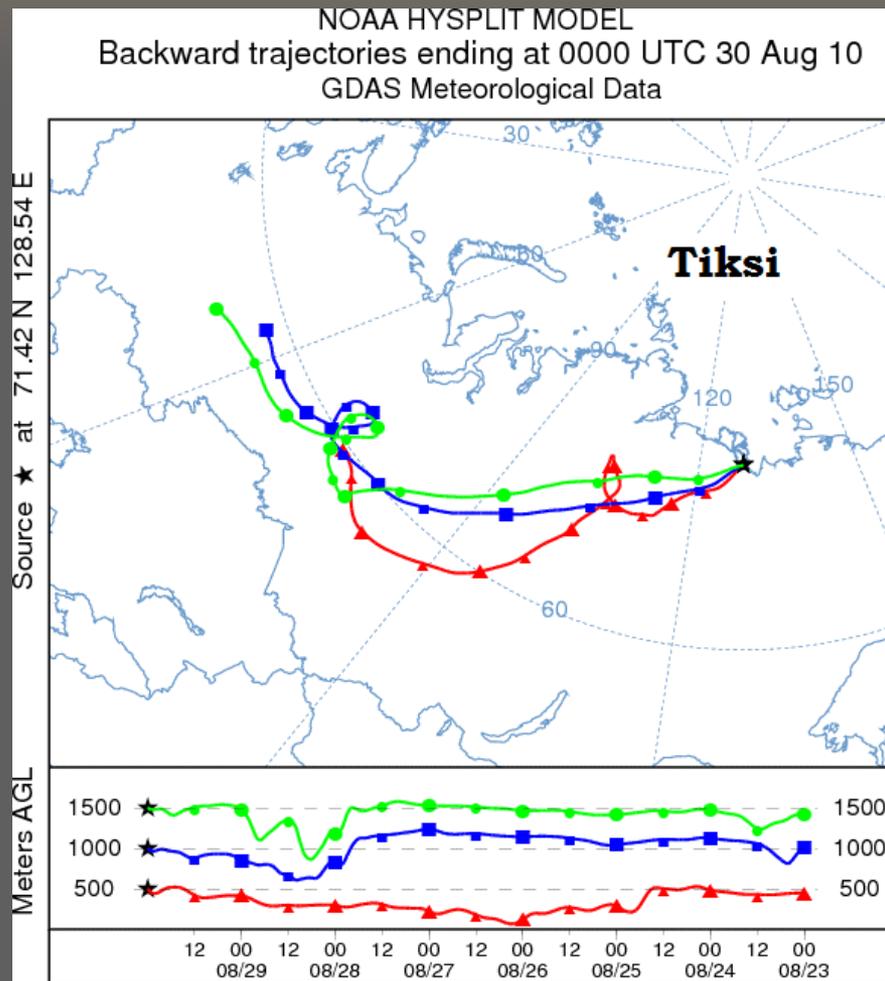
Other POPs at Tiksi

⇒ Polycyclic Aromatic Hydrocarbons (PAH)

⇒ Polybrominated diphenyl ethers



Backward trajectories calculations using NOAA HYSPLIT Model



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**THANK YOU VERY MUCH FOR YOUR
ATTENTION!!!**